MAR THOMA RESIDENTIAL SCHOOL TIRUVALLA

SECOND TERMINAL EXAMINATION

CLASS:XI **MATHEMATICS** **MAXMARK:100**

TIME:3H

The question paper consists of 3 sections A,B,C. The candidates are required to attempt all the questions from Section A and all the questions from either from Section B or Section C

Section–A

1.

a. How many terms of the AP 26,21,16,11,.....are needed to give the sum 11.
b. Find the slope of the line which is perpendicular to the line $7x+11y-2=0$.
c. Find the value of x and y $(1+i)y^2+(6+i)=(2+i)x$.
d. Find the centre and radius of the circle $2x^2+2y^2-3x+8y-1=0$.
e. If the sum of an infinite GP is $\frac{80}{9}$ and its common ratio is $-\frac{4}{5}$. Find its first term?
f. Write the complex number $\frac{-16}{1+i\sqrt{3}}$ in polar form.
g. In what ratio does the point $(1,\frac{7}{2})$ divide the join of (-2,-4) and $(2,\frac{-10}{3})$.
h. Find the equations of two straight lines which are parallel to the straight line $x+7y+2=0$ and a unit distance from the point (2,-1).
i. Prove that the centres of three circles $x^2+y^2-4x-6y-12=0$, $x^2+y^2+2x+4y-5=0$ and $x^2+y^2-10x-16y+7=0$ are collinear.
j. Show that the point (1,2) is equidistant from the lines $4x-3y+7=0$ and $5x+12y=16$.

(2× 10)

1) If a,b,c are in AP ,a,x,b and b,y,c are in GP then show that x^2,b^2,y^2 are in AP. (4
2) Find the equation of the straight line which passes through the point (3,4) and has intercept on the axes such that their sum is 14. (4
3) if $x=a+b$, $y=a\omega+b\omega^2$, $z=a\omega^2+b\omega$. Prove that $x^2+y^2+z^2=6ab$, where ω, ω^2 are the cube roots of unity. (4
4) If two diameters of a circle lie along the lines $x-y=9$ and $x-2y=7$ and the area of the circle is 38.5sqcm, find the equation of the circle. (6
5) i)The 1st term of a GP is 1. The sum of its 3rd and 5th term is 90. Find its common ratio (4

ii) Find 2 positive numbers a and b whose AM and GM are 34 and 16 respectively? (2
6) Find the equation of acute angled bisector of lines $3x-4y+7=0$ and $12x-5y-8=0$. (4)
7) i) If $Z=x+iy$ and $W=\frac{1-iz}{z-i}$ and $|W|=1$, then show that Z is purely real. (4)

ii) Find the square root of 16-30i. (2)
8) Find the equation of the tangent to the circle $x^2+y^2-2x-2y-23=0$ and parallel to the line $2x+y+3=0$. (6)

9) Find the sum up to n terms of the series 4+11+22+37+56+..... n terms .

10) Illustrate in the complex plane, the set of points satisfying the condition $|z + i - 2| \leq 2$. (6)

11) Find the equation of the line through the intersection of the lines 3x+y-9=0 and 4x+3y-7=0 and which is perpendicular to the line 5x-4y+1=0. (6)

12) Find the equation of the circle which passes through the points (-2,1) and (3,2) and centre lies on the line 2x+3y+1=0. (6)

(6)

Section–B

1.

a. Find the equation of the parabola whose vertex is (-2,2) and focus (4,2).

b. Find the length of latus rectum, coordinates of focus and equation of directrix of the parabola $x^2 = -12y$.

c. Find the equation of the parabola which passes through (2,3) and axis along x axis. (6)

2. Find the equation of the ellipse with centre at the origin, major axis is along the x axis and which passes through (-3,1) and whose eccentricity is $\sqrt{\frac{2}{5}}$. (4)

3. Find the coordinates of centre,eccentricity, foci, vertices ,equation of directrices of the hyperbola $16x^2-9y^2+32x+36y-164 = 0$.

OR

4. Find the value of K so that the line 2x+y+k=0 may touch the hyperbola $3x^2-y^2=3$. (6)

Section–C

1.

a. The coefficient of correlation between two variables x and y is 0.6. The co-variance is 16. The variance of X is 9. Find the standard deviation of Y series. (2)

b. Calculate the coefficient of correlation between X and Y from the following data using Karl Pearson's method.

X	1	2	3	4	5
Y	2	5	3	8	7

(4)

OR

Find Spearman's rank correlation between mark's in maths and statistics obtained by 10 students.

Mark in mathematics	80	38	95	30	74	84	91	60	66	40
statistics	85	50	92	58	70	65	88	56	52	46

(6)

2. Calculate the index number for the year 2015 with 2011 as the base year by the weighted average of price relative method from the following data?

Commodity	A	B	C	D	E
weight	40	25	5	20	10
Price(perunit)Yr2011	32	80	1	10.24	4
Price(perunit)Yr2015	40	120	1	15.36	3

(4)

3. Find the 3year moving averages for the following observations

year	95	96	97	98	99	2000	2001	2002
Annual sale (in 10000Rs)	3.6	4.3	4.3	3.4	4.4	5.4	3.4	2.4

(6)